Parabolic Elements.

Passage through Perihelion, 1590, Feb. 8·0624, Uraniburg Mean Time, New Style.

Longitude of Perihelion on the orbit	217° 57′ 12″	App. Eq.
Ascending Node	165 56 56	March 10.
Inclination to the Ecliptic	29 29 44	
Log. distance in Perihelion............	9·7541386	
Heliocentric motion.	Retrograde.	

"These elements, compared with the above longitudes and latitudes, give the following differences.

Computed — Observed Place.

March	Long.	Lat.
5	+ 34″	− 75″
6	+ 38	0
7	− 23	+ 160
8	− 126	+ 91
10	+ 75	− 346
11	+ 29	+ 5
12	− 10	+ 106
13	− 95	+ 6
14	+ 8	+ 3
16	+ 69	− 272

The comet of 1590 is described by Martin Mylius in his *Annales Gorlicenses*, published as part of a work entitled *Scriptores Rerum Lusaticorum*, Lipsiæ et Budissæ, 1719; in folio. It was also the subject of a treatise by Matthias Menius, printed in 1591. Lubienietski, in his great work *Theatrum Cometicum*, gives us a chart shewing the path of the comet in the heavens: he quotes Ricciolus and other writers."

It is almost unnecessary to say that the reductions have been made on the best existing data, and according to the most approved methods.

Description of an Astronomical Observatory at Camden Lodge, near Cranbrook, Kent. By the Rev. W. R. Dawes.

"In the autumn of 1845 I erected, in the grounds of my present residence, a small observatory, a brief description of which I beg to present to the Astronomical Society.

In the erection of the building my principal object was to secure perfect dryness, and a speedy equalisation of the interior and exterior temperature. With a view to the first of these requisites, the foundation has been excavated about eighteen inches below the level of the soil, and the boarded floor elevated twelve inches above it: several air-bricks, or gratings, being introduced on all sides to insure a free circulation of air under the floor. On the foundation walls, which rise to the surface, large blocks of stone are laid, in the top of which, at intervals of about three feet, mortices are cut to receive the tenons at the lower end of strong upright posts of fir-wood, the tenons at the upper end of the same being inserted into

mortices in the circular wall-plate. These posts are strengthened by stout diagonal braces, also of fir, extending from the bottom of each post nearly to the top of the adjacent post on each side; thus forming a very firm frame-work. Exterior to this is nailed a sheathing of half-inch pine boarding, tongued and grooved; and over all a covering of stout canvass, laid on upon a thick coat of paint while wet, and immediately covered with another coat on the outside, on which was dusted fine sand in such quantity as the paint would retain. These walls are perfectly weather-proof.

The observatory is divided into two apartments, a transit-room and an equatoreal-room. The slit in the roof of the transit-room is eighteen inches wide, and is closed by a shutter on hinges, which, when open, is kept so by two weights suspended by small chains passing over pulleys placed on the edge of the roof; but it is prevented from swinging beyond the perpendicular position by two rods of oak, extending from the edge of the shutter to the pulleys.

The roof of the equatoreal-room is a nearly hemi-spherical dome. In its general construction it is similar to the dome of Mr. Lassell's observatory at Starfield, described and illustrated by a drawing in Vol. XII. of the Society's *Memoirs*. The interior diameter of the dome-curb is 13 feet 4 inches. The slit is nearly 30 inches wide, and extends rather beyond the apex of the dome. It is closed by a quadrantal shutter divided horizontally into two portions, which are drawn up by cords passing over a roller placed near the apex of the dome, and slide down within the sheathing on the opposite side.

On the top of the wall-plate is fixed a circular iron channel, cast in portions of about 3 feet long. The radius of concavity of the channel is 3 inches. A similar channel is fixed under the curb of the dome; and between the two are placed three iron balls, whose radius is $2\frac{1}{2}$ inches. These move freely, and with so little friction, that the dome is readily turned by pulling a cord attached to the dome-curb. The covering of the dome and of the roof of the transit-room is similar to that of the walls; but an additional coat of paint has been laid on over the sand, to prevent its being detached by the wind, and carried into the observatory. The space between the wall-plate and the dome-curb is covered externally with a curtain of floor-cloth. The interior temperature is speedily reduced to nearly the same point as the exterior, in consequence of the small substance of the walls and roof, which retain very little heat after even the hottest day.

The instruments in the observatory are a transit-circle, a clock, and an achromatic refractor mounted equatoreally.

The transit-circle is 2 feet in diameter, divided by hand on silver to five minutes, and subdivided to single seconds by the micrometer microscopes, four in number, occupying the extremities of two diameters of the circle. The telescope, which possesses great excellence, has an aperture of $2\frac{3}{4}$ inches, and a focus of about 30 inches, and is furnished with five eye-pieces, magnifying from 27 to 123 times. The highest power is almost constantly employed, both

for transits and for angular measurements. This beautiful and efficient little instrument was made by Mr. Simms, for E. B. Beaumont, Esq., from whom I purchased it. It is mounted on stone piers, which rise 4 feet 3 inches above the floor, and stand on a mass of stone resting on the solid, undisturbed clay forming the subsoil. It is sufficiently steady, and preserves its adjustments well. The microscopes are firmly attached to a stout stone fork, forming part of the top of the western pier. The circle is not designed for reversion, but arrangements are made for observing by reflexion. This, however, is resorted to only for the determination of the latitude of the observatory. Declinations of unknown objects are obtained *differentially*, by comparison with stars whose places have been well determined, and especially with the Greenwich stars in the *Nautical Almanac*.

In consequence of the imperfection of my hearing, I found it needful by some means greatly to increase the loudness of the clock-beat. To accomplish this, Mr. Eiffe has applied to it his *loud beat*, which is perfectly effectual, and enables me to hear the clock distinctly while observing, not only with the circle, but also with the equatoreal. This is a valuable acquisition; and, as the loud beat is put in action only during the time of a transit, it produces no perceivable difference in the clock-rate.

Intending that the equatoreal telescope should have an aperture of 6 or 7 inches, I applied to Mr. Dollond for such a one; but, unfortunately, he had not at that time sufficiently perfect materials whereof to construct it. Professor Struve having visited this country soon afterwards, I was induced by his representations to give an order to Messrs. Merz and Mahler, successors to Utzschneider and Fraunhofer, at the Optical Institute in Munich. The size determined on was an aperture of 6 inches and focus of 8 feet, Paris measure. As an object-glass of first-rate excellence was requisite, it was considered only fair to these eminent artists that they should furnish every part of the mounting, notwithstanding some grave objections to the German method of equatoreal arrangement. Owing to the death of one of the partners, M. Mahler, and some vexatious legal proceedings consequent thereon, the completion of the instrument was delayed about ten months beyond the time fixed on, and it did not arrive till near the end of last September. The arrangement of the equatoreal mounting is almost precisely similar to that by Fraunhofer at Dorpat, except that for the cumbrous wooden stand of that instrument is substituted a massive stone pier, much to the advantage of the instrument and the comfort of the observer. The declination axis is 7 feet 6 inches from the floor, and the eye-piece 3 feet 6 inches when the telescope is directed to the zenith. The telescope being accurately counterpoised in all positions, and nearly the whole weight at the upper end of the polar axis supported upon friction rollers, its motions in every direction are quite as easy as is desirable. The clock-work is extremely steady and uniform, the regulation being effected by the friction of small brass balls against the inside of an inverted

frustrum of a cone. The most serious objection which has been urged against the German style of equatoreal mounting is, that, when during the observation of a celestial object the object arrives at the meridian, it is necessary to turn the telescope on the declination axis to the same polar distance on the opposite side, and to turn the polar axis 180°. This objection, however, applies only in a very small degree to the instrument in my possession, including only those objects which lie between 50° and 80° of north declination; and these, being circumpolar, may be more commodiously observed in other situations than close to the meridian: so that, practically, no inconvenience is experienced. It must be acknowledged, however, that in latitudes within 30° of the equator this objection would be of more weight.

The hour circle is divided on silver to single minutes of time; and the two opposite verniers read to 4 seconds, and by easy estimation to one second. The declination circle is divided, also on silver, to 10 minutes, and its two opposite verniers read to 10 seconds, and by estimation to 5 seconds or less.

The repeating, or parallel wire, micrometer is a beautiful piece of workmanship. The position circle is read by each of its two verniers to single minutes. By an ingenious and very efficient contrivance the webs may be illuminated in a dark field; the direction of the illuminating ray with respect to that of the webs being variable at pleasure.

The telescope has a clear aperture of $6\frac{1}{2}$ inches, and a focal length of $8\frac{1}{2}$ feet, English measure. The Huyghenian eye-pieces furnished with it magnify from 85 to 585 times; and the positive eye-tubes of the micrometer from 120 to 690 times. There is also a double annular micrometer, whose eye-piece magnifies 65 times. From its performance under the best circumstances we have had during the late unsettled weather, it may safely be said that the telescope possesses first-rate excellence, uniting great sharpness of definition with extraordinary brilliance. As severe tests of its performance, several of the double stars in the Pulkowa catalogue, found with the refractor of 15 inches' aperture, have been examined, and every one of them set down in that catalogue as of one second central distance by estimation, has been distinctly resolved. The following difficult objects have been satisfactorily measured in position: η *Coronæ*, μ^2 *Boötis*, 7 *Tauri* A & B, δ *Cygni*, ζ *Herculis*, and γ^2 *Andromedæ*. Measures of some of these will be annexed to this communication, as they are objects of special interest. The two very faint stars in the trapezium in *Orion's* nebula have now become well known as a fine telescopic test, especially that near the brightest of the group, and usually called the *sixth* star. Both these were steadily seen on November 1, and again on Nov. 3. The *fifth* star (the preceding one of the whole group) was visible with powers from 125 to 812 (a double convex lens); the *sixth* was steadily seen with powers 125, 195, and 282; occasionally with 425 and \85: but the best power for both was 195. I give these particulars of the observation, because I cannot but think that these

stars must be increasing in brightness; and I beg to recommend them to the notice of observers, as being very interesting objects.

Of γ^2 *Andromedæ* I obtained the following measures on October 23:—

Power.	Obs. Angle.		Weight.
435	279°	47′	4
	282	21	5
	283	18	6
	280	40	6
	279	30	6
572	282	21	6
	284	19	4
	280	46	7
	281	7	6
Mean.........	281	34	
−	180	0	
	101	34	
Zero correction +	11	45	
Angle of position ...	113	19	50

The star presented a good measurable elongation, in best moments *notched*. Central distance estimated at 0″·6. Both the components are precisely of the same colour—a greenish blue.

For comparison of this result with previous ones, we have—

1842·72	P = 126°	36′	Struve, with Pulkowa refractor.
1842·83	125	48	Dawes, with Mr. Bishop's telescope.
1843·33	120	0	Smyth.
1846·81	113	19	Dawes, as above.

Notwithstanding the difficulty of the object, this series renders it extremely probable that we have here a most beautiful binary system.

ζ *Herculis.*	1846·79	P = 112° 44′;	obs. 3;	weight, 13;	power, 322
	·82	112 5	6	48	435
	·88	112 17	5	25	260

The mean, allowing weights, is 112° 14′. This result shews a variation of position amounting to 30° 44′ since my measures of this star at Mr. Bishop's observatory, in 1841. The last of the three sets recorded above was obtained when the star was within a few minutes of the meridian, the sun being little more than half an hour past it.

η *Coronæ.* 1846·88 P = 196° 46′; obs. 6; weight, 29. Easily measured with 435.

μ^2 *Boötis.* 1846·80 P = 283° 49′; obs. 5; weight, 18. Separable with 322, but extremely unsteady.

7 *Tauri* A, B. 1846·91 P = 259° 55′; obs. 3; weight, 16. Decidedly *notched*, but usually very unsteady. Probably binary.

δ *Cygni.* 1846·79 P = 16° 46′; obs. 5; weight, 19; power, 322. Occasionally well seen.

The webs at present in the micrometer being too thick for the accurate measurement of very delicate objects *in distance*, I am not able to give the distances of any of these objects.

A very useful article of furniture in the equatoreal-room is a *Reclinia*, invented by Henry Lawson, Esq., F.R.A.S., for which the silver medal of the Society of Arts was awarded. It is of the smaller kind described and sketched in his "Arrangement of an Observatory." For long-continued observations, in which it is desirable that the observer should be preserved from the unsteadiness and fatigue produced by an awkward posture, it is very valuable, being productive of great comfort to the observer, and highly con-

ducive to accuracy in the results. The ingenuity and simplicity of its construction, and its perfect adaptation to its object, strongly recommend it to general use. Mine was made under Mr. Lawson's superintendence, by C. and W. Roper, of Bath, and is an excellent piece of workmanship. With my telescope it is adapted to all altitudes of the object from 30° to 90°.

A few observations have been made with the meridian circle by direct and reflected vision, for the determination of the latitude of the observatory; but, as neither this nor the longitude is finally settled, I can only state, that the assumed longitude is $2^{m}\ 12^{s}$ east of Greenwich, and the assumed latitude $51^{\circ}\ 6'\ 32''$ N."

Letter from Captain Sir John Ross, R.N., to the President.

"Sir,—I beg leave to submit the following plan and proposal to the President and Council of the Royal Astronomical Society, for their consideration :—

The measurement of an arc of the meridian has long been a great desideratum, and the failure of every attempt that has been made at Spitzbergen for this desirable object, as well as the attempt made to reach the North Pole, has been, because the summer has been selected for that purpose; whereas the spring should have been the season chosen, namely the months of April and May for both services, but which could not be put in execution by the means hitherto adopted.

I have now to inform the President and Council of the Royal Astronomical Society, that I have submitted a plan to the Admiralty for carrying into execution these double and desirable objects, by wintering at Spitzbergen, and employing my officers and crew under the direction of the talented son of the celebrated Professor Schumacher, whom I have engaged for this purpose; while, at the *proper season*, it is my intention to attempt to reach the North Pole on sledges, drawn by Swedish horses, being a modification of the plan proposed first by Dr. Scoresby, and of which that highly-talented and well-informed individual has given his most unqualified approbation. And, from the year's experience I have had in Sweden in that mode of travelling, I can safely assert, that there is no other officer in the navy that possesses these advantages so necessary to complete success, of which neither Dr. Scoresby nor myself have the smallest doubt.

I have made this statement in the hope that, when duly considered by the President and Council of the Royal Astronomical Society, they will be pleased to signify to me their opinion on the importance of the objects in question, and such a recommendation for its being put into execution as they may think fit."